

**BEFORE
THE PUBLIC SERVICE COMMISSION OF
SOUTH CAROLINA**

DOCKET NO. 2018-319-E

In the Matter of:)	
)	REBUTTAL TESTIMONY OF
Application of Duke Energy Carolinas, LLC)	JAY W. OLIVER
for Adjustments in Electric Rate Schedules)	FOR DUKE ENERGY
and Tariffs and Request for Accounting Order)	CAROLINAS, LLC

I. INTRODUCTION

1 **Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS AND CURRENT**
2 **POSITION.**

3 A. My name is Jay W. Oliver. My business address is 400 South Tryon Street,
4 Charlotte, North Carolina. I am employed by Duke Energy Business Services, LLC
5 (“DEBS”) as General Manager, Grid Solutions Engineering and Technology. DEBS
6 provides various administrative and other services to Duke Energy Carolinas, LLC
7 (“DE Carolinas” or the “Company”) and other affiliated companies of Duke Energy
8 Corporation (“Duke Energy”).

9 **Q. DID YOU PREVIOUSLY FILE DIRECT TESTIMONY IN THIS**
10 **PROCEEDING?**

11 A. Yes, I did.

II. PURPOSE AND SCOPE

13 **Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?**

14 A. The purpose of my rebuttal testimony is to respond to portions of the testimony
15 filed by Mr. Anthony Sandonata, witness on behalf of the South Carolina Office of
16 Regulatory Staff (“ORS”) regarding the need for a separate proceeding to review
17 and analyze the Company’s proposed Grid Improvement Plan; and to respond to
18 South Carolina Solar Business Alliance, Inc. witnesses Mr. Hamilton Davis and Mr.
19 Chris Villarreal regarding their assessments of the Company’s Grid Improvement
20 Plan.

III. REBUTTAL TESTIMONY

1 **Q. WHAT IS THE SCOPE OF YOUR REBUTTAL TESTIMONY?**

2 A. In my rebuttal, I respond to several issues regarding the Company's proposed Grid
3 Improvement Plan. I do not respond to the testimony of Kevin O'Donnell, filed on
4 behalf of the South Carolina Energy Users Committee, given the fact that Mr.
5 O'Donnell does not address any substantive issues regarding the proposed Grid
6 Improvement Plan ("Plan") for South Carolina but instead offers his personal
7 reflections on past and outdated issues in North Carolina along with his
8 unsupported speculation about hypothetical expenditures in the future that are not
9 sponsored by the Company.

10 **Q. HOW IS YOUR REBUTTAL TESTIMONY ORGANIZED?**

11 A. In reviewing the testimony of the Office of Regulatory Staff ("ORS") and other
12 parties who discussed the Company's proposed Grid Improvement Plan for South
13 Carolina, I identified three central themes that were present across those
14 testimonies. I have arranged my rebuttal testimony to respond to those three
15 themes. At the outset, however, I would note that no intervenor contested the seven
16 major grid improvement megatrends I identified in my testimony, nor did anyone
17 dispute the fact that these megatrends are having and will continue to have a
18 meaningful impact on South Carolina. In fact, several intervenors¹ affirmatively
19 agreed with these megatrends and commended the Company for properly
20 identifying and expounding on them. Therefore, it seems that no party seriously

¹ Witness Sandonato, on behalf of the Office of Regulatory Staff, page 11; Witness Villareal, on behalf of the South Carolina Solar Business Alliance, page 9; Witness Davis, on behalf of the South Carolina Solar Business Alliance, page 14.

1 contests the fact that South Carolina has a real and present need to address each of
2 these seven megatrends with grid improvement interventions.²

3 **Q. WHAT ARE THE THREE THEMES THAT YOU IDENTIFIED IN YOUR**
4 **REVIEW OF ORS AND INTERVENOR TESTIMONY?**

5 A. With the established fact that South Carolina needs some form of grid improvement
6 to address these impending megatrends, ORS and several intervenors raise three
7 principal issues: (1) a separate proceeding is needed to review the Company's
8 proposed Grid Improvement Plan; (2) more information is needed regarding the
9 benefits that the proposed Grid Improvement Plan will provide; and (3) the
10 proposed Grid Improvement Plan's design; namely that the Company's proposed
11 Plan did not provide detail as to what the Company will do in the years that follow
12 the Plan to continue with grid improvement efforts.

13 **Q. WILL YOU PLEASE SUMMARIZE YOUR RESPONSES TO THESE**
14 **THREE ISSUES?**

15 A. Yes. The ORS and other parties³ take issue with the Company seeking an advance
16 prudence review of the Grid Improvement Plan and they lament the extensive
17 amount of information that the Company has filed to support the Plan even though
18 a report that ORS cites in its testimony speaks to the benefits of an advance
19 prudence review. This aversion to an advance review is confusing to me because
20 all of these same stakeholders, including ORS, have consistently stated that they

² One intervenor witness questioned how the programs and projects in the Grid Improvement Plan aligned with the megatrends that the Company identified. In Exhibit 2, pages 2 through 24, to my direct testimony, I provided a detailed analysis of how the Plan would impact these megatrends over the next ten years. In Exhibit 5 to this testimony, I provide an additional narrative and source document that was used to create that exhibit in my direct testimony.

³ Witness Sandonato, on behalf of the Office of Regulatory Staff, page 5; Witness Davis, on behalf of the South Carolina Solar Business Alliance, page 13; Witness Tillman, on behalf of Walmart, page 14.

1 want to be engaged and provide input to the Plan in advance of the Company taking
2 action on it. These same parties, in the two previous stakeholder workshops that
3 the Company conducted in South Carolina, have also requested that the Company
4 provide an extraordinary amount of detail and supporting documentation to support
5 the Plan and now they cry foul because we have done so. Stated simply, parties
6 cannot fairly ask to be engaged and provide advance input on this Plan and then
7 refuse to provide input claiming that an advance review of the Plan is somehow
8 unfair.

9 Next, and oddly contrary to their argument that advance reviews are unfair
10 to customers, the ORS and other parties⁴ state that they need more detailed
11 information on the expected benefits that the Grid Improvement Plan will provide
12 so they can review them in advance of any approvals. Notably, neither ORS nor
13 any other party ever asked for additional detail on Plan benefits throughout the
14 discovery process. Nonetheless, I have provided extensive additional detail to
15 support the benefits expected from the Plan in my exhibits to this rebuttal testimony.

16 Finally, the SC Solar Business Alliance raises several questions as to why
17 the Plan was not designed to solve issues that they appear to have with South
18 Carolina's renewable energy policies and interconnection procedures. I explain that
19 these issues are being addressed in other forums and that the Company's Plan is
20 designed to address the megatrends that no party disputes are impacting South
21 Carolina right now.

⁴ Witness Sandonato, on behalf of the Office of Regulatory Staff, page 5; Witness Davis, on behalf of the South Carolina Solar Business Alliance, page 13; Witness Tillman, on behalf of Walmart, page 14.

1 **Q. WILL YOU PLEASE NOW SPEAK TO THE FIRST MAJOR ISSUE**
2 **RAISED BY PARTIES IN THIS PROCEEDING REGARDING THE**
3 **COMPANY’S PROPOSED RATE STEP UPS FOR RECOVERY OF GRID**
4 **IMPROVEMENT PLAN COSTS?**

5 A. Yes. The ORS first states that it did not have sufficient time to properly review and
6 analyze the Company’s proposed plan within this matter. Based on this allegation,
7 the ORS suggests that the proposed Grid Improvement Plan be reviewed in a
8 separate proceeding outside of this one. The issue of whether ORS has had proper
9 time in this proceeding to review the Grid Improvement Plan and whether they have
10 diligently attempted to do so is beyond the scope of my expertise, but however the
11 Grid Improvement Plan is reviewed, there must be some mechanism in place to
12 avoid the debilitating effects that regulatory lag has on deploying a grid
13 improvement plan for the State.

14 **Q. WHAT DO YOU MEAN WHEN YOU SAY THAT REGULATORY LAG HAS**
15 **A DEBILITATING EFFECT ON DEPLOYING A GRID IMPROVEMENT**
16 **PLAN?**

17 A. It is important for stakeholders to recognize that just like any other company that
18 has to manage a monthly budget and pay bills, a regulated utility has a limited
19 amount of funds to pay a given amount of expenses. Unlike unregulated companies
20 that can simply raise the price of their products as they see fit to cover incremental
21 expenses, the Company’s income stream to pay for projects needed to maintain a
22 base level of service to customers in South Carolina is set by the Commission in
23 base rate proceedings like this one and once that revenue stream is set, the Company

1 cannot increase it without filing another base rate case⁵. This means that every day,
2 the Company must decide what projects and programs it will deploy and which
3 ones that it will not, which, in turn, means that programs and projects must compete
4 against each other for funding priority. Thus, in order to fund incremental work
5 like the Grid Improvement Plan, the Company must borrow money between its rate
6 cases to pay for new work, and borrowing money naturally comes with a cost.

7 In instances where the Company has large, centralized projects that take
8 longer to complete (such as building a new power plant), regulatory rules allow the
9 utility to apply a carrying charge to the funds that the Company has to borrow and
10 pay interest on to complete this work as a principle of fundamental fairness. In
11 other words, one cannot reasonably expect the company to borrow money and pay
12 interest on that money on behalf of customers to build a power plant that will serve
13 those customers and then not pay the Company back for the money it borrowed
14 plus the interest it had to pay on it. However, the same regulatory rules that apply
15 to these large, time-intensive projects do not apply to smaller and quickly-installed
16 programs and projects like those included in the Grid Improvement Plan. To ensure
17 that utilities are not discouraged from these smaller programs that deliver benefits
18 more quickly to customers, regulators often enact measures to avoid the problem
19 of regulatory lag such as rider recovery, rate adjustment step ups, or deferral
20 accounting treatment with returns for such projects.

⁵ In South Carolina, I understand that there are limitations as to how often a company may file rate cases which exacerbates the issue of regulatory lag.

1 **Q. ARE YOU SUGGESTING THAT THE COMPANY WILL NOT PERFORM**
2 **ANY OF THE WORK IN THE GRID IMPROVEMENT PLAN IF THE**
3 **COMMISSION DOES NOT APPROVE SOME METHOD TO AVOID**
4 **REGULATORY LAG ON THOSE PROJECTS?**

5 A. No, but without a reasonable method to address regulatory lag, the work in the Grid
6 Improvement Plan would have to be sub-optimized, delayed, diminished in scope
7 and effectiveness, and potentially not done at all in some instances given the fact
8 that the Company cannot reasonably be expected to obtain incremental funding for
9 these projects at a substantial loss. In such a situation, the Company would have to
10 try and perform small pieces of the Grid Improvement Plan over a much longer
11 period of time within its existing revenues, delaying important benefits and
12 potentially essential improvements for customers.

13 **Q. WHAT OTHER ISSUES DID PARTIES HAVE WITH THE COMPANY'S**
14 **PROPOSED GRID IMPROVEMENT RATE STEP UPS?**

15 A. ORS and other parties⁶ contend that it is unfair and unwise for the Company to
16 obtain an advance prudence review of the Grid Improvement Plan. They also
17 contend that the Company's proposed method of recovery unfairly disconnects
18 customers from the O&M costs savings that they will enjoy under the Plan.

19 **Q. WILL YOU PLEASE RESPOND TO THE FIRST ISSUE REGARDING**
20 **PRUDENCE REVIEWS?**

21 A. Yes. The ORS and other parties are correct that the Company has requested that
22 the Commission review the proposed three-year Grid Improvement Plan for

⁶ Witness Sandonato, on behalf of the Office of Regulatory Staff, page 5; Witness Davis, on behalf of the South Carolina Solar Business Alliance, page 13; Witness Tillman, on behalf of Walmart, page 14.

1 prudence in this proceeding but they are incorrect to suggest that this request is
2 unfair or ill-advised⁷. First, these parties argue that the Company should just do
3 whatever grid improvement work that it wants to do and then come back to
4 stakeholders after this work is done to see if everyone agrees that the work was
5 prudent. While this is the traditional way that the Company conducts its base
6 operations work, it is not the way that stakeholders have previously requested that
7 the Grid Improvement Plan be reviewed through our engagement process. In fact,
8 the Company has uniformly heard that stakeholders want to be engaged and have
9 their input heard in developing and deploying a grid improvement plan for the State
10 and the Company has accommodated this request by conducting stakeholder
11 workshops prior to filing the Grid Improvement Plan in this proceeding. Further,
12 rather than just filing information on historical grid improvement work that the
13 Company has performed and asking for an after-the-fact review of that work, the
14 Company, pursuant to what stakeholders have asked for, filed an unprecedented
15 amount of detail outlining the work that the Company plans to do to improve the
16 grid in South Carolina over the next three years so that those same stakeholders can
17 be engaged and weigh in on that plan as many of them have done. This is exactly
18 the process that ORS cites to in Witness Sandonato's testimony on page 8, lines 16-
19 17 wherein he cites a report from GridLab (page 14). Therefore, it is confusing to
20 me why any party in this proceeding has suggested that an advance prudence review

⁷ It is important to note that the Company is not requesting that the Commission approve the prudence of the execution of the Grid Improvement Plan and the ultimate costs and benefits that will flow from the Plan, and the Company agrees that that the prudence of those issues should be determined in future proceedings. Instead, the Company has asked the stakeholders in this proceeding to address any issues of prudence with the substance and content of the Grid Improvement Plan which is an entirely reasonable request prior to the Company deploying the Plan.

1 of the substance of the Grid Improvement Plan is unwarranted when they have all
2 uniformly asked to review and provide input on the Plan before the Company
3 deploys it.⁸

4 **Q. WHAT IS YOUR RESPONSE TO THE ALLEGATION THAT THE**
5 **COMPANY'S PROPOSED METHOD OF COST RECOVERY**
6 **DISCONNECTS OPERATIONS AND MAINTENANCE COSTS SAVINGS**
7 **FROM THE RECOVERY OF GRID IMPROVEMENT COSTS?**

8 A. Some parties⁹ alleged that it would be unfair for the Company to recover the
9 ongoing costs of the Grid Improvement Plan in a rate step-up mechanism without
10 also capturing the ongoing O&M savings that the Company anticipates it will
11 achieve with the Plan. If the Commission approves the Company's proposed grid
12 rate step ups, the Company does not have any issue with those annual step ups being
13 offset by the amount of O&M costs that the Company anticipates saving during
14 those same periods, subject to true up for both costs and savings. If the Commission
15 does not approve the proposed grid step ups but instead approves deferral
16 accounting treatment for Grid Improvement Plan costs with a carrying charge, then
17 the issue of O&M savings being disconnected with cost recovery is no longer
18 relevant because both grid improvement costs and grid improvement savings would
19 be considered at the same time in a future base rate proceeding.

⁸ A testament to the wisdom of advance prudence reviews for grid improvement initiatives is found in this very case where all the parties were able to express their questions and concerns and have those issues addressed prior to the Company deploying its proposed Plan.

⁹ Witness Tillman, on behalf of Walmart, at page 23.

1 **Q. WHAT IS THE NEXT MAJOR THEME THAT YOU OBSERVED IN ORS**
2 **AND INTERVENOR TESTIMONY?**

3 A. All the parties who spoke to the Company's Grid Improvement Plan stated that they
4 would like to see more detailed information regarding the benefits that the Plan is
5 expected to provide customers. Many parties also stated that they would like to see
6 quantifiable targets for grid improvement to measure the ongoing performance of
7 the Grid Improvement Plan. Finally, ORS, by citation to a report authored by a
8 non-party, suggests that the costs of the Company's proposed Plan may be
9 understated by fifty percent which, in turn, would negatively impact the Company's
10 cost/benefit analyses.

11 **Q. WILL YOU PLEASE RESPOND TO THE FIRST ISSUE REGARDING**
12 **MORE DETAIL ON THE BENEFITS THAT THE GRID IMPROVEMENT**
13 **PLAN WILL PROVIDE SOUTH CAROLINA CUSTOMERS?**

14 A. Yes. Several parties stated that the Company needs to specifically state whether the
15 proposed Grid Improvement Plan and its associated method of cost recovery will
16 avoid future rate cases; eventually lower rates; provide better service; provide better
17 reliability; and enable customer options such as rooftop solar, electric vehicles, and
18 energy conservation. The short answer is "yes," and the proposed Grid
19 Improvement Plan can help do all of these things for South Carolina customers as
20 detailed in my pre-filed direct testimony and as further explained here.

21 In Exhibit 1 to this testimony, I have included cost/benefit analyses and the
22 underlying data sources and work sheets for all the programs and projects in the
23 "Optimize" portion of the Company's proposed Plan which encompasses more than

1 sixty percent of the costs for the Plan.¹⁰ Exhibit 2 to this testimony shows that the
2 programs in the Company's plan designed to optimize the South Carolina grid have
3 a positive net present value ratio of 4.2. This means that for every dollar spent on
4 these programs and projects, South Carolina customers should receive a payback
5 of \$4.20 in primary benefits. Also in Exhibit 2 of this testimony, I have included a
6 total primary benefit analysis of the entire Grid Improvement Plan portfolio, and
7 this document shows that all the costs in the plan (costs to protect, modernize, and
8 optimize the South Carolina Grid) have a positive total net present value benefit
9 ratio of 3.0. This means that for every dollar spent on the total Plan, South Carolina
10 customers should receive a payback of \$3.00 in primary benefits. In Exhibit 3 to
11 this testimony, I have included an analysis of the primary and secondary benefits
12 that the Grid Improvement Plan should provide to customers and residents of South
13 Carolina, and this document shows that all the costs in the plan (costs to protect,
14 modernize, and optimize the South Carolina Grid) have a positive total net present
15 value secondary benefit ratio of 1.7. This means that for every dollar spent on the
16 total Plan, South Carolina customers and residents should receive an additional
17 payback of \$1.70 in secondary benefits. Finally, as reflected in Exhibit 3, if both
18 the primary and secondary benefits of the Grid Improvement Plan are considered
19 together, the total Grid Improvement Plan should provide South Carolina customers
20 and residents a positive total net present value of 4.7, meaning that every dollar
21 spent on the Plan should provide a payback of \$4.70.

¹⁰Cost/benefit analysis is only appropriate for certain types of costs in a grid improvement plan and other costs (such as physical and cyber security and core system operating systems) should only be reviewed to ensure that they have been selected and deployed in reasonable manner. The GridLab report for South Carolina that ORS cites to in its testimony recognizes this fact on page 22 of their report.

1 **Q. IN YOUR DISCUSSION OF THE BENEFITS OF THE GRID**
2 **IMPROVEMENT PLAN, YOU REFER SEVERAL TIMES TO PRIMARY**
3 **(DIRECT) AND SECONDARY (INDIRECT) BENEFITS. WOULD YOU**
4 **PLEASE EXPLAIN THE DISTINCTION BETWEEN THESE TWO SETS**
5 **OF BENEFITS?**

6 A. Yes. Primary benefits consist of value that is directly captured by the Company and
7 by customers. Examples of primary benefits captured by the Company are things
8 like avoided deployments of outage restoration crews, avoided equipment
9 replacement costs, avoided operations and maintenance savings, and other “hard
10 costs” that can easily be estimated and quantified. Direct benefits captured by
11 customers are things like avoided lost product, avoided damaged equipment costs,
12 avoided lost wages, and other expenses that cost customers money. In Exhibit 4 to
13 this testimony, I have included a graphic example of a “benefits pyramid” that
14 shows how the benefits of electric utility projects are thought about and evaluated
15 in the industry. As can be seen from this graphic and from the cost/benefit results
16 in Exhibit 3, the Company’s proposed Grid Improvement Plan is justified in its
17 entirety just on primary benefits alone. However, the proposed Grid Improvement
18 Plan for South Carolina also provides indirect, secondary benefits to customers
19 through risk reduction; value to third parties, and value to society as a whole, which
20 are reflected on the top three rungs of the benefits pyramid displayed on Exhibit 4.
21 Of these indirect/secondary benefits, the Company has estimated the indirect value
22 of the Plan to third parties, and the details of this evaluation are reflected in Exhibit
23 3. However, the Company has not attempted to value the indirect benefits of risk

1 reduction and the benefits to society as a whole for the Grid Improvement Plan,
2 which means that the benefits of the Plan are understated and are greater than what
3 the Company has calculated.

4 **Q. WHAT IS YOUR RESPONSE TO THE ASSERTION THAT THE GRID**
5 **IMPROVEMENT PLAN SHOULD HAVE QUANTIFIABLE TARGETS**
6 **AND METRICS TO MEASURE THE PERFORMANCE AND RESULTS OF**
7 **THE WORK IN THE PLAN?**

8 A. I agree with this contention, and the cost/benefit analyses in Exhibit 1 to this
9 testimony provide those metrics for each of the projects and programs that are
10 appropriate for such metrics.¹¹ Specifically, the cost/benefit analyses performed by
11 the Company detail, among other things, the amount of O&M savings the Company
12 anticipates from the Plan; the amount of avoided capital costs the Company
13 anticipates from the Plan; and the amount of outages that each of the programs and
14 projects within the Plan are anticipated to avoid.

15 **Q. SINCE THE GRID IMPROVEMENT PLAN DOES HAVE QUANTIFIABLE**
16 **TARGETS AND METRICS TO MEASURE THE PERFORMANCE AND**
17 **RESULTS OF THE WORK IN THE PLAN, IS THE COMPANY WILLING**
18 **TO GUARANTEE THAT PERFORMANCE AND THOSE RESULTS?**

19 A. I believe that the Company already provides a guarantee on the performance of the
20 work that it does through prudence reviews that are inherent in the regulatory
21 process. To explain, unlike unregulated companies that are free to spend their

¹¹ Some programs/projects cannot be effectively measured by detailed performance metrics and targets. For example, computer hardware and software that enables grid assets to communicate with each other either works or does not work, and measures taken to prevent substations from flooding in major storms either keep water out or do not keep water out.

1 money any way that they see fit, a regulated utility must always prove to regulators
2 that the work it performs delivers customers the value that they pay for. For
3 example, if the Company builds a generation facility that is supposed to deliver 100
4 megawatts of power to customers, that unit must deliver 100 megawatts of power
5 to customers unless the Company has a reasonable and prudent reason why it is not
6 doing so. If the Company does not have a reasonable and prudent reason for work
7 not delivering the value it is supposed to, the Company is subject to a disallowance
8 for the cost of that work. The work to be performed in the Grid Improvement Plan
9 is no different. If customers do not get the value they pay for under the Plan, the
10 Company remains at risk for a prudence disallowance unless the company can
11 provide reasonable and prudent reasons as to why they did not.

12 **Q. EARLIER, YOU MENTIONED A REPORT REFERENCED BY ORS**
13 **SUGGESTING THAT THE COSTS OF THE GRID IMPROVEMENT PLAN**
14 **MAY BE UNDERSTATED BY AS MUCH AS FIFTY PERCENT, THEREBY**
15 **LOWERING THE COST TO BENEFIT RATIOS OF PROGRAMS AND**
16 **PROJECTS IN THE PLAN. CAN YOU PLEASE ELABORATE?**

17 A. Yes. The testimony of ORS Witness Sandonato cites a third-party report released
18 by an organization known as GridLab. This organization released a report titled
19 “Modernizing the Grid in the Public Interest: Getting a Smarter Grid at the Least
20 Cost for South Carolina Customers” (“GridLab SC Report”) that purports to
21 analyze Duke Energy’s Grid Improvement Plan across both DEC and DEP in South
22 Carolina. In the GridLab SC Report, the GridLab organization states the following
23 regarding the Company’s proposed Grid Improvement Plan for South Carolina:

1 “Duke Energy appears to estimate costs based on the capital it will spend to
2 implement the Plan. However, customers pay more than capital costs. On
3 top of capital costs, customers must pay Duke Energy profits, corporate
4 income taxes, and interest expenses, as well as South Carolina Gross
5 Receipts taxes, local property taxes on assets, and South Carolina
6 Regulatory Fees. These costs, called carrying charges, grow larger as the
7 useful life of the assets grows longer. Most assets in the Plan are long-lived,
8 and are expected to last 20-30 years. In GridLab’s experience, carrying
9 charges add anywhere from 50% to 100% to the ultimate cost to customers
10 of long-lived assets (15-20 years or more). Other costs missing from Duke
11 Energy’s benefit-cost analyses include increases in asset operations and
12 maintenance costs over time. GridLab recommends that customer benefit-
13 to-cost ratios be re-calculated, with all costs customers will be asked to pay
14 considered.”

15 **Q. IS THIS CONTENTION IN THE GRIDLAB REPORT ACCURATE?**

16 A. No, it is not. Let me first say that I am not criticizing the GridLab SC Report for
17 raising this issue because they did not have visibility into the detail of how the
18 Company has calculated costs for the Plan at the time when they authored their
19 report, and they are not a party to this case capable of conducting discovery. In its
20 cost/benefit analyses for the Grid Improvement Plan, the Company has, through its
21 process of discounting to calculate the NPV, used a discount rate that includes the
22 cost of interest, shareholder return, and corporate income taxes. If the project
23 causes incremental, ongoing maintenance cost, then those costs are also included
24 in the cost/benefit analyses and escalated over time. For example, the inclusion of
25 the SC weighted average cost of capital (discount rate for NPV) can be seen in cost
26 benefit analyses provided in Exhibit 1.

27 **Q. CAN YOU ELABORATE ON THE THIRD AND FINAL MAJOR THEME**
28 **THAT YOU IDENTIFIED IN INTERVENOR TESTIMONY?**

29 A. Yes. The third and final major theme that I observed stated concerns with how the
30 Company has designed the Grid Improvement Plan. Within this major theme, I

1 identified the following sub-issues that I will respond to in the balance of my
2 testimony:

- 3 1. The Plan does not address South Carolina renewable generation interconnection
4 issues;
- 5 2. The Plan does is not designed to encourage and enable additional utility-grade
6 solar to be added to the grid;
- 7 3. The Plan is not the product of integrated systems planning and thus, has not
8 avoided the construction of large grid investments such as new substations and
9 lines;
- 10 4. The Plan does not fully address customer data access and new rates that are
11 enabled by smart meters;
- 12 5. The Plan does not contain details on alternatives that were considered in lieu of
13 the programs and projects in the Plan;
- 14 6. The Company's testimony does not adequately describe how all the programs
15 and projects in the Plan work together; and
- 16 7. The Plan stops at three years and does not inform stakeholders what comes next.

17 **Q. WHAT IS YOUR RESPONSE TO CONCERNS THAT THE PROPOSED**
18 **GRID IMPROVEMENT PLAN DOES NOT ADDRESS LARGE**
19 **RENEWABLE GENERATION INTERCONNECTION ISSUES IN SOUTH**
20 **CAROLINA?**

21 A. I completely agree that the Plan does not address issues regarding the policies,
22 procedures, and positions of stakeholders regarding the interconnection of large
23 renewable energy resources in South Carolina because that is not what the Plan is

1 designed to do, nor should it be. I understand that state and federal rules and
2 policies dictate how these interconnection issues are addressed, and I further
3 understand that vibrant discussions regarding these issues are ongoing in South
4 Carolina in other forums. While there are some programs and projects in the Plan
5 that may provide ancillary benefits to interconnection issues that are secondary to
6 their primary purposes (such as voltage management, more capacity for distributed
7 energy resources on the distribution system via aspects of the Self-Optimizing Grid
8 program, and upgrades to certain transmission line structures and power
9 transformation assets), the Company cannot and should not attempt to get ahead of
10 federal and state rules and evolving policy issues regarding interconnection in the
11 Grid Improvement Plan.

12 **Q. WHAT IS YOUR RESPONSE TO THE STATEMENTS THAT THE**
13 **PROPOSED GRID IMPROVEMENT PLAN DOES NOT ENCOURAGE**
14 **AND ENABLE INCREMENTAL LARGE RENEWABLE ENERGY**
15 **GENERATORS TO BE ADDED TO THE GRID?**

16 A. Much like my highly-related discussion of interconnection issues for these large
17 renewable generation assets, the Grid Improvement Plan is not designed and should
18 not be designed to lead, or worse, get ahead of rules, policies, and robust
19 engagement on renewable energy policy in South Carolina. While I can say with
20 confidence that the Grid Improvement Plan will “do no harm” to large renewable
21 generators and may, (through secondary, ancillary benefits), help enable some of
22 these resources, the Company’s proposed Plan is designed to address the

1 megatrends that I identified in my direct testimony in a comprehensive and cost-
2 beneficial manner.

3 **Q. HOW DO YOU RESPOND TO ARGUMENTS THAT THE GRID**
4 **IMPROVEMENT PLAN IS NOT THE PRODUCT OF A MATURE**
5 **PLANNING PROCESS THAT HAS THE CAPABILITY TO DEFER**
6 **LARGE, TRADITIONAL CAPITAL INVESTMENTS SUCH AS NEW**
7 **SUBSTATIONS OR NEW POWER LINES?**

8 A. Some intervenors¹² suggest that an integrated resource planning analysis would
9 have yielded superior options to the programs and projects in the Company's
10 proposed Plan. I disagree and address those arguments later in my testimony when
11 I discuss alternative options for the Plan. However, for the intervenors who have
12 suggested that the Company's proposed Plan is deficient because it is not the result
13 of a mature and functioning integrated system operations planning process
14 ("ISOP") that can analyze potential investment choices in an interrelated fashion
15 between generation, transmission, distribution, and other potential resources and
16 tools, I disagree that the Company's Plan is deficient as it does include the
17 deployment of ISOP, but I agree that ISOP will be a useful tool when completed.

18 **Q. PLEASE EXPLAIN WHAT YOU MEAN?**

19 A. A modern deployment of integrated systems operations planning¹³ is a cutting-edge
20 and evolving process that requires thoughtful design and deployment. In our
21 regulated jurisdictions, stakeholders usually are not criticizing Duke Energy for not

¹² Witness Villareal, on behalf of the South Carolina Solar Business Alliance, page 14; Witness Davis, on behalf of the South Carolina Solar Business Alliance, pages 13 and 15.

¹³ I provide more detail on ISOP and what it does in my direct testimony in Exhibit 9, page 39.

1 already having ISOP in place but instead are requesting that they be included to
2 provide stakeholder input as the Company designs and perfects its ISOP
3 deployment. This is due to the fact that those stakeholders realize that the electric
4 industry as a whole has not yet perfected the ISOP process because the costs,
5 capabilities, and the viability of new grid assets, such as batteries and distributed
6 energy resources, are changing every day. As discussed in my direct testimony and
7 reiterated here, the Company is well underway in developing ISOP today, including
8 gathering input from stakeholders, and the Company cannot reasonably be
9 criticized for not having this tool in place now.

10 **Q. WHAT IS YOUR POSITION REGARDING CRITICISMS THAT THE**
11 **GRID IMPROVEMENT PLAN DOES NOT DETAIL HOW CUSTOMERS**
12 **WILL BENEFIT FROM ACCESS TO THEIR USAGE DATA AND FROM**
13 **NEW RATE DESIGNS THAT ARE ENABLED BY ADVANCED**
14 **METERING CAPABILITIES?**

15 A. I agree that smart meters; new rates that result from them; and enhanced availability
16 of usage data for customers are all important aspects of the Grid Improvement Plan.
17 However, other witnesses in this case, such as Witnesses Schneider and Pirro, are
18 better positioned to discuss the details of these issues for South Carolina.

19 **Q. HOW DO YOU RESPOND TO ARGUMENTS THAT THE COMPANY DID**
20 **NOT PERFORM AN ALTERNATIVES OPTIONS ANALYSIS FOR**
21 **PROJECTS AND PROGRAMS IN THE GRID IMPROVEMENT PLAN?**

22 A. I first need to provide clarity on what an alternative options analysis means, and
23 will use a substation flood mitigation project in the Company's Plan as an example

1 to explain two varying types of alternative options analyses. The first type of
2 alternative options analysis using this example involves conducting an inventory of
3 the potential actions you can take to prevent a substation from flooding, including
4 taking no action at all. In this type of analysis, the choices available to the Company
5 are to allow the substation in question to flood and take no action; elevate the
6 equipment in the substation; deploy perimeter boundary interventions to keep water
7 from entering the station; or relocate the station entirely. This type of analysis is
8 logical and reasonable, and is exactly the kind of analysis that the Company
9 performed in designing the proposed Grid Improvement Plan. You could also apply
10 this analysis for other work, such as determining how to harden electric poles to
11 extreme wind standard by using a concrete pole, a steel pole, or bracing and guying
12 techniques.

13 The second type of alternative options analysis is the type that some
14 intervenors in this case suggest that the Company should have used, and I take issue
15 with this suggestion. This second type of alternative options analysis is where,
16 using my two examples above, the Company asks whether it can abandon the use
17 of substations and poles altogether thereby eliminating any worry that they will
18 flood or break in extreme wind conditions. This type of theoretical thinking, while
19 perhaps possible in the distant future, is not realistic today and cannot be seriously
20 considered as some intervenors may suggest.¹⁴

¹⁴ These types of arguments are much like the suggestion that the electric industry should convert to 100% renewable energy now, a feat that could very well be impossible. See <https://www.wsj.com/articles/the-green-new-deals-impossible-electric-grid-11550705997>

1 **Q. DID ANY INTERVENORS OFFER SPECIFIC EXAMPLES OF**
2 **PROGRAMS OR PROJECTS THAT THEY CONTEND THE COMPANY**
3 **SHOULD HAVE USED IN LIEU OF THE ONES IN THE COMPANY’S**
4 **PROPOSED PLAN?**

5 A. Yes, some did. Witness Villareal states, or at least infers, that the Company should
6 use “smart inverters” instead of deploying its Integrated Volt/VAR Control
7 (“IVCC”) program in South Carolina. It appears, however, that Witness Villareal
8 either does not understand how IVCC works and/or does not understand that IVCC
9 and smart inverters can actually complement each other. The Company’s IVCC
10 proposal is a “no regrets” foundational program that delivers needed value today
11 (to include energy conservation, reduced line losses, fuel savings, and Self-
12 Optimizing grid circuit reconfiguration) while providing a circuit voltage profile
13 more compatible with deep distributed energy resource (“DER”) penetration. The
14 circuits that passed the cost/benefit screening process are generally concentrated
15 around urban core areas that are generally not suitable for utility-scale solar due to
16 higher land costs and a lack of undeveloped land. It is perfectly aligned however
17 with areas where residential choices to participate in rooftop solar are most likely
18 to occur in concentrated amounts. Some other general observations regarding
19 Witness Villareal’s argument are:

- 20 • Use of inverters to effectively manage the integration of intermittent DER assets
21 will not make the foundational investments of IVVC obsolete, but are in fact
22 one of several options for how the value created by IVVC investments are

1 preserved (along with power electronics for voltage management, storage for
2 solar smoothing, and other advanced modern equipment).

- 3 • As stated, the circuits not included in the current IVVC program are generally
4 those in the rural areas where large scale utility solar tends to locate. The
5 scenario Witness Villareal raises makes the flawed assumption that these
6 investments are in direct competition when they in fact are complementary.
7 IVVC infrastructure provides voltage management capability needed today to
8 support circuit re-configuration and to operate the grid more efficiently to the
9 benefit of our customers. As DER penetration rises, the need will emerge for
10 this capability to be augmented by assets with the speed to manage DER
11 intermittency and DER power quality induced issues. Addressing these issues
12 involves assets like smart inverters, storage for solar smoothing, and power
13 electronics, and represents investments layered on top of (rather than instead
14 of) a base IVCC foundation.
- 15 • GridLab's analysis in Virginia in the Dominion case cites IVVC and SOG
16 investments as industry best practices that should be part of foundational
17 investments in grid modernization investments.

18 **Q. THE GRIDLAB SC REPORT CITED BY ORS SUGGESTS THAT DUKE**
19 **ENERGY SHOULD EVALUATE ALTERNATIVES TO THE PROPOSED**
20 **\$36 MILLION FOR SUBSTATION PHYSICAL SECURITY. CAN YOU**
21 **PROVIDE YOUR OPINON ON THAT SUGGESTION?**

22 **A.** Page 43 of Oliver Exhibit 4 in my direct testimony states that the physical
23 substation security subprogram “enhances the grid resiliency as part of the overall

1 Transmission Security program. Tier 1 site enhancements include high security
2 perimeter fencing and lighting, intrusion detection technology, new security
3 enclosure buildings, hardening of existing control houses, security cameras, and
4 access control. Tier 2 site enhancements include high security perimeter fencing
5 and lighting.” The criteria used to determine what work is necessary in this area
6 are discussed at length in my direct testimony on pages 33-34. There simply are no
7 better alternatives to addressing the substation physical security projects than these,
8 nor has ORS or any other party offered any. To the extent that ORS or any other
9 party is suggesting that the Company should not secure these substations using
10 these measures, that suggestion is misguided and would be out of line with evolving
11 industry standards.

12 **Q. THE GRIDLAB SC REPORT THAT ORS CITES ALSO SUGGESTS THAT**
13 **DUKE ENERGY SHOULD EVALUATE ALTERNATIVES TO \$41**
14 **MILLION FOR ENTERPRISE COMMUNICATIONS NETWORK**
15 **INVESTMENTS. CAN YOU EXPLAIN WHY THAT SUGGESTION IS**
16 **MISGUIDED?**

17 A. The smart meter communications network is already deployed for DEC and is in
18 the process of being deployed for DEP, as discussed extensively in the testimony
19 of Company witness Schneider, so there was no need to mention it in the Grid
20 Improvement Plan. Interestingly, the transition to 4G/5G mentioned by GridLab is
21 addressed as part of the “Next Generation Cellular” program discussed on page 47
22 of Oliver Exhibit 4. The other programs mentioned as part of Enterprise

1 Communications serve different functions than the advanced meter
2 communications infrastructure, and GridLab doesn't discuss those programs.

3 **Q. SCSBA WITNESSES VILLAREAL AND DAVIS GENERALLY SUGGEST**
4 **THAT THE COMPANY'S PLAN SHOULD BE REJECTED BECAUSE IT**
5 **WAS NOT DEVELOPED THROUGH "BEST PRACTICES" IN**
6 **PLANNING? HOW DO YOU RESPOND?**

7 A. Witness Davis, who cited the GridLab SC Report for best practices in distribution
8 planning, may not have read the report that GridLab released regarding Dominion's
9 grid plan in Virginia titled "Modernizing the Grid in the Public Interest: A Guide
10 for Virginia Stakeholders" ("GridLab VA Report")¹⁵. The GridLab VA Report
11 recommended a majority of the substantive investments included in the Company's
12 Plan. The GridLab VA Report listed "software to improve grid reliability,
13 resilience, and DER hosting capacity" and "software to improve grid energy
14 efficiency" as "characteristics of a "no regrets" grid modernization plan" (GridLab
15 VA Report, page 9). Regarding improved reliability, resilience, and DER hosting
16 capacity, the GridLab VA Report says, "Better grid state visibility, analytics, and
17 reconfiguration are not only useful for accommodating DER in a reliable manner;
18 these same capabilities can also improve grid reliability and resilience irrespective
19 of installed DER capacity" (GridLab VA Report, page 10). The Company's plan
20 obtains those capabilities through its Self-Optimizing Grid program, which is
21 described as part of increased grid configuration flexibility on page 11 of the

¹⁵ [See GridLab Virginia Report:
https://static1.squarespace.com/static/598e2b896b8f5bf3ae8669ed/t/5bbe4f71e2c4835fa247183f/1539198852367/GridLab_VA+GridMod_Final.pdf

1 GridLab VA Report. As for improving grid energy efficiency, the GridLab VA
2 Report says, “A certain type of software called “Integrated Volt-VAR Optimization”
3 software improves grid efficiency by optimizing, as the name implies, the voltage
4 and VAr (power factor) of electricity delivered to customers” (GridLab VA Report,
5 page 11). The Company’s Plan also delivers that functionality as part of its IVVC
6 program. Therefore, it is odd to me that parties in this case continue to cite
7 GridLab’s work as support for arguments against the Company’s proposed Plan
8 when the GridLab’s reports actually support the Company’s Plan in multiple
9 material aspects.

10 **Q. CAN YOU ELABORATE ON THE ADVANCED DISTRIBUTION**
11 **PLANNING TOOL THAT WAS INCLUDED AS ONE OF THE GIP**
12 **PROJECTS AND HOW IT WILL HELP SUPPORT INTEGRATED**
13 **DISTRIBUTION PLANNING?**

14 A. The current distribution planning process is an intensive manual effort that
15 comprises: Circuit load flow model updates, load forecasting, and evaluating
16 improvements to the grid to alleviate capacity and reliability issues. With an
17 increasing presence of intermittent DER being added to the distribution system, this
18 approach to distribution planning needs to evolve.

19 The Advanced Distribution Planning (ADP) process and tool set evolves
20 our distribution planning process to address the presence of DER on the grid. The
21 ADP tool that is under development incorporates computational models for time
22 based power flow calculations which include the new distributed resources (e.g.
23 solar, storage, EV’s) and support evaluations of potential solutions including

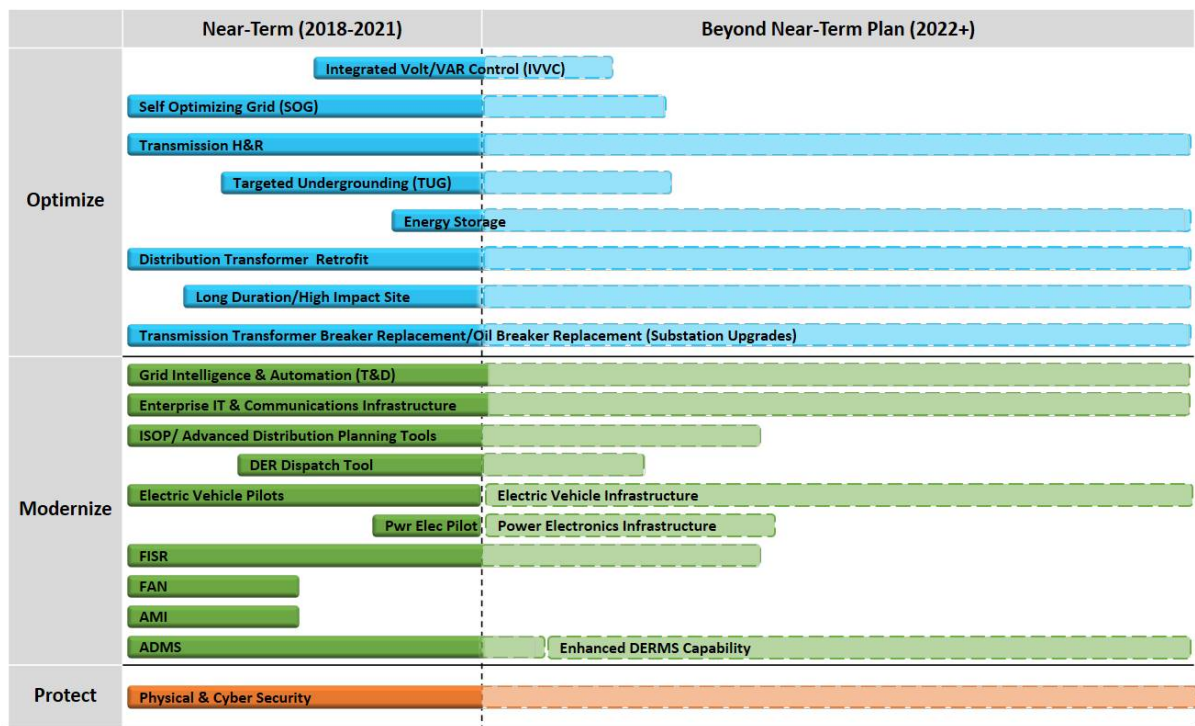
1 traditional solutions and new alternative distributed resource solutions. The
2 process will help support increased alignment between distribution, transmission
3 and generation improvements being considered for the grid. ADP creates an
4 integrated distribution planning framework which enables the business to optimize
5 traditional solutions and DER integration across the system.

6 **Q. MOVING ON TO THE NEXT ISSUE THAT INTERVENORS RAISE IN**
7 **THE MAJOR THEME OF PLANNING THE GRID IMPROVEMENT**
8 **PLAN, WHAT DO YOU SAY IN RESPONSE TO ALLEGATIONS THAT**
9 **THE COMPANY DID NOT PROVIDE ADEQUATE DETAILS ON HOW**
10 **THE PROGRAMS AND PROJECTS IN THE PLAN ALL WORK**
11 **TOGETHER?**

12 A. Witness Villarreal contends that the Company's Grid Improvement lacks
13 cohesiveness and is a random collection of projects and programs without
14 thoughtful design. In his testimony, he cites Xcel Energy's Minnesota grid
15 improvement plan as effectively being the "gold standard" for effective plan
16 synergies. Based on the figure 7 graphic from page 23 of Witness Villarreal's
17 testimony, however, the Company's SC Grid Improvement Plan aligns well with
18 Xcel Energy's Minnesota plan. In fact, it appears to me that the Company is ahead
19 of where Xcel is today. The graphic below depicts the SC Grid Improvement Plan
20 in a similar graphic layout as the one in Witness Villarreal's testimony. This graphic
21 demonstrates that the SC Grid Improvement Plan contains many of the same
22 components included in Xcel's plan. DEC SC has already deployed smart meters,
23 Field Area Network (FAN) and filed a SC Electric Vehicle Pilot. The Company has

1 already been advancing work on Integrated Systems Operations Planning and
 2 advanced planning tools that the entire electric industry is grappling with as we
 3 seek to cost effectively integrate DER onto the grid. Additionally, the Company
 4 doesn't see a need to wait to begin evaluating and cost effectively integrating IVVC,
 5 energy storage and non-wires alternatives as depicted in Witnesses Villarreal's
 6 graphic and instead is doing so now. Through our stakeholder feedback sessions in
 7 SC, stakeholders wanted to see newer technologies such as IVVC, energy storage,
 8 non-wires alternatives, EV infrastructure show up faster in the Company's plan and
 9 we have met that desire in our proposed Plan.

South Carolina Grid Investments (Planned & Road Mapped)



1 **Q. HOW DOES THE ADDITIONAL GRAPHIC HIGHLIGHTED BY**
2 **WITNESS VILLARREAL ON PAGE 24 OF HIS TESTIMONY**
3 **CONTRAST WITH THE SC GRID IMPROVEMENT PLAN?**

4 A. The second graphic in Witness Villareal's testimony is myopic in nature and only
5 focuses on levels of DER as a presumptive "sole outcome" for a grid improvement
6 plan. In contrast to this unilateral view of grid improvement, the Company
7 performed a much broader and holistic analysis of impacts to the grid highlighted
8 through the seven major grid improvement megatrends outlined in my testimony of
9 which increased DER was one of seven. Additionally, in Exhibit 3 of my direct
10 testimony, I highlight the implications of not implementing the Grid Improvement
11 Plan tying those implications to all the megatrends, including DER enablement. I
12 am happy to say that the SC Grid Improvement Plan seeks to begin to solve for all
13 seven megatrends, not just DER for its SC customers by increasing monitoring and
14 visibility, increasing automation, increasing distributed intelligence, improving
15 reliability, hardening for resiliency, enabling voltage control, accommodating two-
16 way power flows, modernizing grid operations, improving cyber security,
17 improving physical security, expanding customer options and capabilities, and
18 increasing hosting capacity.

1 **Q. WITNESS VILLARREAL INFERS THAT THE COMPANY MAY BE**
2 **LOOKING SHORT-TERM AND MAY BE MISSING OPPORTUNITIES TO**
3 **LAY THE FOUNDATION FOR MODERATE TO HIGH LEVELS OF DER**
4 **ADOPTIONS. IS THAT TRUE?**

5 A. No. As noted previously, the Company has already been working on IVVC, SOG,
6 ISOP, AMI, ADMS and seeks to enhance Distributed Energy Resource
7 Management (DERMS) capabilities with the current plan set forth in SC. If
8 anything, we along with the stakeholder input, see the need to react faster to the
9 megatrends specifically happening in SC than Witness Villarreal recommends.

10 **Q. WHAT IS THE FINAL ISSUE THAT INTERVENORS RAISE REGARDING**
11 **THE DESIGN OF THE GRID IMPROVEMENT PLAN?**

12 A. Some intervenors¹⁶ expressed concerns that the Company's proposed Plan did not
13 provide detail as to what the Company will do in the years that follow the Plan to
14 continue with grid improvement efforts. Our current three-year plan is a "no
15 regrets" package of well-coordinated grid improvements. It does not need a "phase
16 2" to be cost effective. The plan begins preparing the SC grid for the implications
17 resulting from the megatrends highlighted in my testimony. Also, the current
18 stakeholder informed three-year plan begins to prepare the SC grid for growth in
19 privately owned DER and electric vehicles, but even if this growth does not occur,
20 the plan still is cost effective and warranted. This is proven in our cost benefit
21 analyses.

¹⁶ Witness Villareal, on behalf of the South Carolina Solar Business Alliance, at pages 13, 14 and 18.

1 That being said, the current three-year plan does set South Carolina up for
2 other improvements that could warrant a second phase of the plan, and we plan to
3 engage and work with stakeholders before deploying any such plan. Below are
4 potential programs for consideration and stakeholder input:

- 5 1. **Phase 2 of Self-Optimizing Grid.** The current 3-year SOG plan enables
6 228 circuits with approximately 300,000 customers. Our vision is to serve
7 approximately 80% of SC customers from the Self-Optimizing Grid that
8 enables two-way power flow and dynamic switching.
- 9 2. **Phase 2 of IVVC.** The current four-year IVVC plan enables 74 of DEC SC
10 total 218 substations. A phase 2 project could focus on the next, most cost
11 effective, group of substations and circuits.
- 12 3. **Increased Implementation of Power Electronics.** The current IVVC and
13 SOG programs set up the basic capacity, automation, and Volt/VAR control
14 mechanisms to manage the 21st century grid. As privately owned DER
15 grows, power electronics will be essential to managing the rapid and
16 dynamic effects of multiple, small scale intermittent resources.
- 17 4. **44 KV projects that enable solar capacity.** Through continuing
18 coordination with stakeholders and regulators, these projects may afford
19 new opportunities that provide value to customers.
- 20 5. **ISOP Optimization.** As the Company and the industry continues to develop
21 and deploy ISOP, best practices and lessons learned can be utilized to
22 optimize the ISOP process.

1 **6. Increased use of Energy Storage.** Energy Storage is part of our current
2 three-year plan but is still in a startup phase. We believe many more
3 opportunities will exist as batteries become more cost effective and as we
4 learn more about their capabilities on the grid.

5 This list is certainly not comprehensive. It is intended to lay out options that build
6 off of the currently proposed three-year plan. We are committed to continued
7 stakeholder to help inform a more comprehensive list.

8 **IV. CONCLUSION**

9 **Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?**

10 A. Yes.